Annex 1 to Appendix V – South Staffs Water Final WRMP 2019

The table below is table 32 in the South Staffs draft water resources management plan (WRMP) which we published for public consultation in March 2018:

Option type	Number of unconstrained options
Maintenance of existing groundwater	27
Maintenance of existing surface water – including production losses	112
New groundwater	98
New surface water	
Third party water and trades	
Leakage reduction	190
Metering	
Water efficiency	
Total	427

We have listed the 27 unconstrained '*Maintenance of existing groundwater*' options below:

	Option Unique Identifier	***Title***	***Option Description***
1	Ash3	Ash De-Nitrate Plus CM	Ash De-Nitrate Plus CM
2	BVCM	BV Capital Maintenance	BV Capital Maintenance
3	BV1	BV Mn	BV Mn
4	BV2	BV Mn Plus CM	BV Mn Plus CM
5	CCCM	CC Capital Maintenance	CC Capital Maintenance
6	ChCM	CH Capital Maintenance	CH Capital Maintenance
7	Ch1	CH De-Nitrate	CH De-Nitrate
8	Ch2	CH De-Nitrate Plus CM	CH De-Nitrate Plus CM
9	CoCM	Co Capital Maintenance	Co Capital Maintenance
10	Co1	Co De-Nitrate	Co De-Nitrate
11	Co2	Co De-Nitrate Plus CM	Co De-Nitrate Plus CM
12	HCM	H Capital Maintenance	H Capital Maintenance
13	K3	K De-Nitrate plus CM	K De-Nitrate plus CM
14	KCM	K capital maintenance	K capital maintenance
15	PCM	P Capital Maintenance	P Capital Maintenance
16	CWCM	CW Capital Maintenance	CW Capital Maintenance
17	FCM	F Capital Maintenance	F Capital Maintenance
18	HOPCM	HOP Capital Maintenance	HOP Capital Maintenance
19	MBCM	MB Capital Maintenance	MB Capital Maintenance
20	MB1	MB De-Nitrate	MB De-Nitrate
21	MB2	MB De-nitrate plus CM	MB De-nitrate plus CM
22	MCM	M Capital Maintenance	M Capital Maintenance
23	MGCM	MG Capital Maintenance	Morse Gorse Capital Maintenance
24	PHCM	PH Capital Maintenance	PH Capital Maintenance
25	SMCM	SM Capital Maintenance	Existing Groundwater

26	TVCM	TV Capital Maintenance	Existing Groundwater
27	LHReF	LH De-nitrates plus Refurb	Improvements at LH BH

We have listed the 112 unconstrained '*Maintenance of existing surface water – including production losses'* options below:

		Type	Treatment process	Variant / Option
1	**RIVER SEVERN WTW**	Conventional water treatment process streams	No build / no change (2017)	No change to existing assets. Retain clarifiers, GAC filters and chlorine disinfection
2	**RIVER SEVERN WTW**		Replace with identical process	Rebuild clarifiers, GAC filters and chlorine disinfection
3	**RIVER SEVERN WTW**		Add pre and post ozone to existing processes	No change to existing assets. Retain clarifiers, GAC filters and chlorine disinfection
4	**RIVER SEVERN WTW**			Rebuild clarifiers, GAC filters and chlorine disinfection
5	**RIVER SEVERN WTW**		Low rate sedimentation clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	Utilise existing structures (just add new GAC)
6	**RIVER SEVERN WTW**		High rate sedimentation clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	
7	**RIVER SEVERN WTW**		Ballasted floc sedimentation clarifiers (actiflo), Sand / anthracite RGFs, GAC, chlorine disinfection	
8	**RIVER SEVERN WTW**		Low rate DAF clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	
9	**RIVER SEVERN WTW**		High rate DAF clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	
10	**RIVER SEVERN WTW**		Hybrid high rate DAF and sedimentation clarifier, Sand / anthracite RGFs, GAC, UV and chlorine disinfection	
11	**RIVER SEVERN WTW**		Selected clarifier, RGF, GAC, UV and chlorine disinfection	
12	**RIVER SEVERN WTW**		Selected clarifier, RGF, ozone, GAC, UV and chlorine disinfection	
13	**RIVER SEVERN WTW**		CoCo DAF, GAC and chlorine disinfection	

14	**RIVER SEVERN WTW**		CoCo DAF, GAC, UV and chlorine disinfection	
15	**RIVER SEVERN WTW**		Chlorine dioxide selected clarifier and filter, GAC, chlorine disinfection	
16	**RIVER SEVERN WTW**	Conventional 'variant' options	Selected clarifier & filter, GAC, manganese contactor, chlorine disinfection	
17	**RIVER SEVERN WTW**		Selected clarifier & filter, GAC, manganese contactor, UV and chlorine disinfection	
18	**RIVER SEVERN WTW**		Selected clarifier & filter, ozone & Biological Activated Carbon (BAC), microstrainers, chlorine disinfection	
19	**RIVER SEVERN WTW**		Selected clarifier & filter, ozone & Biological Activated Carbon (BAC), microstrainers, ozone disinfection, marginal chlorination	
20	**RIVER SEVERN WTW**	Slow sand filter based options (No Clarification)	Roughing (sand) filters, Slow sand filters, chlorine disinfection	
21	**RIVER SEVERN WTW**		Roughing (sand) filters, ozone, Slow sand filters with GAC sandwich, chlorine disinfection (SSFs need to have treated water storage to manage demand profile)	
22	**RIVER SEVERN WTW**		Roughing (sand) filters, ozone, Slow sand filters with GAC sandwich, UV and chlorine disinfection	
23	**RIVER SEVERN WTW**		Roughing (GAC) filters, Slow sand filters, chlorine disinfection	
24	**RIVER SEVERN WTW**		Roughing (GAC) filters, ozone, Slow sand filters with GAC sandwich, chlorine disinfection	
25	**RIVER SEVERN WTW**		Roughing (GAC) filters, ozone, Slow sand filters with GAC sandwich, UV and chlorine disinfection	
26	**RIVER SEVERN WTW**	Microfiltration / Ultrafiltration process options	Roughing (GAC) filters, coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	
27	**RIVER SEVERN WTW**		Roughing (GAC) filters, coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
28	**RIVER SEVERN WTW**		Roughing (sand) filters, coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	submerged

29	**RIVER SEVERN WTW**		Roughing (sand) filters, coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
30	**RIVER SEVERN WTW**		Coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	
31	**RIVER SEVERN WTW**		Coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
32	**RIVER SEVERN WTW**	Novel treatment process streams	Suspended ion exchange with ceramic membrane filtration, GAC and chlorine disinfection	
33	**RIVER SEVERN WTW**		As per Hall WTW (GAC roughing, submerged UF, UV & H2O2, GAC, UV, marginal Cl2)	
34	**RIVER SEVERN WTW**		Pre-treatment (screening), nanofiltration, remineralisation, chlorine disinfection	
35	**RIVER SEVERN WTW**		Selected conventional processes but include MIEX as additional organics removal stage	
36	**RIVER SEVERN WTW**		Selected conventional processes plus nitrate removal (ion exchange)	
37	**RIVER SEVERN WTW**	Raw water intake and storage	River Intake	Tighter abstraction WQ limits (could affect strategic resilience of Chelmarsh vol)
38	**RIVER SEVERN WTW**			Relocate intake
39	**RIVER SEVERN WTW**		Chelmarsh reservoir	CFD analysis and improve mixing (bubble curtain / mechanical / inlets / outlets) plus sediment analysis
40	**RIVER SEVERN WTW**			Install floating PV array
41	**RIVER SEVERN WTW**			phosphate stripping, barley straw, ultrasonics
42	**RIVER SEVERN WTW**			Sediment analysis
43	**RIVER SEVERN WTW**			different inlet draw off levels
44	**RIVER SEVERN WTW**			intake screens (fish screen for Eel Regs)

45	**RIVER SEVERN WTW**			Catchment management (nutrients from sludge)
46	**RIVER SEVERN WTW**	Micropollutant Technologies (emerging pesticides including chlortal, pharmaceutical by-products, geosmin & MIB). These are in ADDITION to the selected treatment process	Powdered Activated Carbon - dosed at reservoir / reservoir intake	
47	**RIVER SEVERN WTW**		Actiflo carb	
48	**RIVER SEVERN WTW**		UV & titanium dioxide	
49	**RIVER SEVERN WTW**		Saratech	
50	**RIVER SEVERN WTW**		desal (RO)	
51	**RIVER SEVERN WTW**		blending - chlorthal, atrazine	
52	**RIVER SEVERN WTW**		UV & peroxide	
53	**RIVER SEVERN WTW**	Washwater / sludge / waste streams	Retain existing (currently a Put and Take arrangement with EA)	
54	**RIVER SEVERN WTW**		Replace / upgrade	
55	**RIVER SEVERN WTW**		Return treated washwater to head of works	
56	**CENTRAL WTW**	Conventional water treatment process streams	No build / no change	No change to existing assets. Retain clarifiers, GAC filters, UV and chlorine disinfection
57	**CENTRAL WTW**		Replace with identical process	Rebuild clarifiers, GAC filters, UV and chlorine disinfection
58	**CENTRAL WTW**		Add pre and post ozone to existing processes	No change to existing assets. Retain clarifiers, GAC filters, UV and chlorine disinfection
59	**CENTRAL WTW**			Rebuild clarifiers, GAC filters and chlorine disinfection
60	**CENTRAL WTW**		Low rate sedimentation clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	Utilise existing structures (just add new GAC)
61	**CENTRAL WTW**		High rate sedimentation clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	

62	**CENTRAL WTW**		Ballasted floc sedimentation clarifiers (actiflo), Sand / anthracite RGFs, GAC, chlorine disinfection	
63	**CENTRAL WTW**		Low rate DAF clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	
64	**CENTRAL WTW**		High rate DAF clarifiers, Sand / anthracite RGFs, GAC, chlorine disinfection	
65	**CENTRAL WTW**		Hybrid high rate DAF and sedimentation clarifier, Sand / anthracite RGFs, GAC, UV and chlorine disinfection	
66	**CENTRAL WTW**		Selected clarifier, RGF, GAC, UV and chlorine disinfection	
67	**CENTRAL WTW**		Selected clarifier, RGF, ozone, GAC, UV and chlorine disinfection	
68	**CENTRAL WTW**		CoCo DAF, GAC and chlorine disinfection	
69	**CENTRAL WTW**		CoCo DAF, GAC, UV and chlorine disinfection	
70	**CENTRAL WTW**		Chlorine dioxide selected clarifier and filter, GAC, chlorine disinfection	
71	**CENTRAL WTW**	Conventional 'variant' options	Selected clarifier & filter, GAC, manganese contactor, chlorine disinfection	
72	**CENTRAL WTW**		Selected clarifier & filter, GAC, manganese contactor, UV and chlorine disinfection	
73	**CENTRAL WTW**		Selected clarifier & filter, ozone & Biological Activated Carbon (BAC), microstrainers, chlorine disinfection	
74	**CENTRAL WTW**		Selected clarifier & filter, ozone & Biological Activated Carbon (BAC), microstrainers, ozone disinfection, marginal chlorination	
75	**CENTRAL WTW**	Slow sand filter based options	Roughing (sand) RGFs, Slow sand filters, chlorine disinfection	
76	**CENTRAL WTW**		Roughing (sand) RGFs, ozone, Slow sand filters with GAC sandwich, chlorine disinfection (SSFs need to have treated water storage to manage demand profile)	
77	**CENTRAL WTW**		Roughing (sand) RGFs ozone, Slow sand filters with GAC sandwich, UV and chlorine disinfection	
78	**CENTRAL WTW**		Roughing (GAC) RGFs Slow sand filters, chlorine disinfection	
79	**CENTRAL WTW**		Roughing (GAC) RGFs ozone, Slow sand filters with GAC sandwich, chlorine disinfection	
80	**CENTRAL WTW**		Roughing (GAC) RGFs ozone, Slow sand filters with GAC sandwich, UV and chlorine disinfection	
81	**CENTRAL WTW**	Microfiltration / Ultrafiltration process options	Roughing (GAC) RGFs coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	
82	**CENTRAL WTW**		Roughing (GAC) RGFs coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
83	**CENTRAL WTW**		Roughing (sand) filters, coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	submerged

84	**CENTRAL WTW**		Roughing (sand) filters, coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
85	**CENTRAL WTW**		Coagulation and polymeric micro/ultrafiltration, GAC, chlorine disinfection	
86	**CENTRAL WTW**		Coagulation and ceramic micro/ultrafiltration, GAC, chlorine disinfection	
87	**CENTRAL WTW**	Novel treatment process streams	Suspended ion exchange with ceramic membrane filtration, GAC and chlorine disinfection	
88	**CENTRAL WTW**		As per Hall WTW (GAC roughing, submerged UF, UV & H2O2, GAC, UV, marginal Cl2)	
89	**CENTRAL WTW**		Pre-treatment (screening), nanofiltration, remineralisation, chlorine disinfection	
90	**CENTRAL WTW**		Selected conventional processes but include MIEX as additional organics removal stage	
91	**CENTRAL WTW**		Selected conventional processes plus nitrate removal (ion exchange)	
92	**CENTRAL WTW**	Raw water intake and storage	Nethertown River intake (not used continuously)	pumping regime to minimise costs
93	**CENTRAL WTW**			Manually cleaned bar screens - tie in mechanical screens with Eel regs
94	**CENTRAL WTW**			Move abstraction to Trent to increase resilience (in event of Blithfield contamination)
95	**CENTRAL WTW**		Blithfield reservoir	CFD analysis and improve mixing (bubble curtain / mechanical / inlets / outlets) plus sediment analysis
96	**CENTRAL WTW**			phosphate stripping, barley straw, ultrasonics
97	**CENTRAL WTW**			intake screens (fish screen for Eel regs)
98	**CENTRAL WTW**			hydro scheme - pump up at night and recovery turbine during day
99	**CENTRAL WTW**			increase raw storage from cost, resources
100	**CENTRAL WTW**			Post Blithfield overflow storage reservoir
101	**CENTRAL WTW**			Catchment management (underway - Stu Jones)
102	**CENTRAL WTW**			Install floating PV array ~~or balls~~
103	**CENTRAL WTW**	Micropollutant Technologies (emerging pesticides	Powdered Activated Carbon - dosed at reservoir / reservoir intake	
104	**CENTRAL WTW**		Actiflo carb	

105	**CENTRAL WTW**	including chlortal, pharmaceutical by-products, geosmin & MIB). These are in ADDITION to the selected treatment process	UV & titanium dioxide
106	**CENTRAL WTW**		Saratech
107	**CENTRAL WTW**		desal (RO)
108	**CENTRAL WTW**		blending - chlorthal, atrazine
109	**CENTRAL WTW**		UV & peroxide
110	**CENTRAL WTW**	Washwater / sludge / waste streams	Retain existing (return Filter Rinse waters)
111	**CENTRAL WTW**		Replace / upgrade
112	**CENTRAL WTW**		Return treated washwater to head of works (Settled Backwash Water - with no UV)

We have listed the 98 unconstrained '*New groundwater, new surface water and third party water and trades'* options below:

	New ref.	***Previous ref.***	***Option Description***
1	1.1.1	SSW03Ai	Drill new boreholes in Stour Valley: Upgrade K BH
2	1.1.2	SSW03Aii	Drill new boreholes in Stour Valley: Upgrade P
3	1.1.3a	SSW03B	Drill new boreholes in Stour Valley: New borehole at H BH site - Blending
4	1.1.3b	SSW03B	Drill new boreholes in Stour Valley: New borehole at H BH site - Nitrate Treatment
5	1.1.4	SSW03D	Drill new boreholes in Stour Valley: Increase production at Co
6	1.1.5	SSW05A	Develop boreholes at Ash: Abandon boreholes 1 & 2, replace with recommissioned boreholes 5 & 6.
7	1.1.6	SSW05B	Develop boreholes at Ash: New boreholes 7 & 8 to get peak output capacity
8	1.1.7	SSW42	Reinstate SS BH
9	1.1.9	SSW12A	New groundwater source and treatment works in Warton Unit: New source and infrastructure.
10	1.1.10	n/a	Reinstate SA BH for potable supply
11	1.1.11	n/a	Improvements at LH BH
12	1.1.12	n/a	Treat SO BH water in isolation from SH.
13	1.2.1	SSW12B	New groundwater source and treatment works in Warton Unit: New source and connect to existing CC WTW
14	1.2.2	SSW12C	New groundwater source and treatment works in Warton Unit: New source and connect to upgraded CC WTW
15	1.2.3	SSW04A	Expand CC Treatment Works: Renew existing boreholes on site
16	1.2.4	SSW04B	Expand CC Treatment Works: Increase output from existing boreholes with enhanced treatment.

17	n/a	SSW16A1	Aquifer storage and recovery (ASR): Increase HA BH output
18	n/a	SSW16A2	Aquifer storage and recovery (ASR): Pumping raw water into EVA
19	n/a	SSW16A3	Aquifer storage and recovery (ASR): Use HA BH to augment river flows
20	n/a	SSW16A4	Aquifer storage and recovery (ASR): Distribute River Severn WTW WTW output into HA BH aquifer
21	n/a	SSW20	Develop groundwater under Birmingham: TBC following Severn Trent ASR Appraisal.
22	n/a	SSW22	New groundwater source and treatment works in M Unit
23	n/a	SSW51	HE Borehole
24	n/a	SSW52	Maximise BV
25	1.3.1	SSW06A	Drill a new borehole at TV: Replace existing borehole pumps, transfer to Central WTW WTW.
26	1.3.2	SSW06B	Drill a new borehole at TV: New borehole and headworks, transfer to Central WTW WTW.
27	1.3.3	SSW06C	Drill a new borehole at TV: Modification to licence to enable conjunctive use with Blithfield.
28	n/a	SSW07	Treat WH Wood
29	1.3.4	SSW08A	New Borehole at Central WTW: Additional borehole at Central WTW WTW.
30	1.3.5	SSW08B	New Borehole at Central WTW: Additional borehole at Roxane bottling plant.
31	n/a	SSW08C	New Borehole at Central WTW: Increase output at MB borehole.
32	n/a	SSW09A	Increase pumping and treatment capacity at CW: New satellite borehole, minor increase in production.
33	n/a	SSW09B	Increase pumping and treatment capacity at CW: Two new satellite boreholes, large increase in production.
34	n/a	SSW10A	Develop Hulme Springs: Refurbish/replace existing borehole.
35	n/a	SSW11B	Blend WH Wood with BV
36	n/a	SSW18A	New (confined) borehole for supporting Blithfield: New borehole and link to Blithfield reservoir
37	n/a	SSW18B	New (confined) borehole for supporting Blithfield: As A but with combined treatment with Brindley Bank
38	1.4.1	SSW56A	Improve and enhance SH and SO outputs
39	1.4.2	SSW56B	Upgrade SH treatment plant
40	1.4.3	SSW14A	New groundwater source and treatment works in Coven Unit: New source and infrastructure
41	1.4.4	SSW14B	New groundwater source and treatment works in Coven Unit: New source and connect to existing treatment plant
42	1.4.5	SSW14C	New groundwater source and treatment works in Coven Unit: New source and connect to upgraded treatment plant at SH. Assumes refurbishment of SH to achieve outputs from that site as well.
43	2.1.1	SSW23	40 Ml/d capacity raw water abstraction from the Trent to Blithfield
44	2.1.2	SSW39A	Augmenting Blithfield Reservoir from northern rivers: Diversion of Stoke on Trent foul drainage in Upper Blithe

45	2.2.1	SSW24A	Increase storage at Blithfield: Increase dam height by 1m
46	2.2.2	SSW24B	Increase storage at Blithfield: Increase dam height by 2m
47	2.2.3	SSW24C	Increase storage at Blithfield: Downstream bankside storage
48	2.2.4	SSW24D	Increase storage at Blithfield: Upstream bankside storage
49	2.2.5	SSW24E	Increase storage at Blithfield: Catchment measures
50	2.2.6	SSW40	Flood storage licence Blithfield Reservoir
51	n/a	SSW01A	Vary Nethertown/Trent licence: Use existing infrastructure to pump raw water back to Blithfield reservoir.
52	n/a	SSW01B	Vary Nethertown/Trent licence: Upgrade infrastructure to pump 50Ml/d raw water to Blithfield reservoir.
53	n/a	SSW01C	Vary Nethertown/Trent licence: Direct supply of raw water to Central WTW WTW.
54	n/a	SSW39B	Augmenting Blithfield Reservoir from northern rivers: Transfer of River Teane water upstream of Checkley
55	n/a	SSW39C	Augmenting Blithfield Reservoir from northern rivers: Transfer of River Dove water
56	n/a	SSW39D	Augmenting Blithfield Reservoir from northern rivers: Transfer from River Trent - Brindley Bank
57	n/a	SSW15A	Conjunctive use of Blithfield with River Severn WTW: Raw water conveyance from River Severn to Blithfield reservoir enabling conjunctive use.
58	n/a	SSW41	Conjunctive use of Blithfield Reservoir
59	n/a	SSW44	Recirculation of Hanch Tunnel water to Blithfield
60	2.3.1	SSW34A	Modify Chelmarsh: Increase dam by 2m
61	2.3.2	SSW34B	Modify Chelmarsh: Increase dam height by less than 2m
62	3.1.1	SSW27	Conjunctive use of Blithe/Trent surface and groundwater
63	3.2.1	SSW13A	Conjunctive use of Severn surface and groundwater: Additional abstraction from the Severn, upgrade River Severn WTW WTW
64	3.2.2	SSW13B	Conjunctive use of Severn surface and groundwater: New intake on River Severn and transfer to existing treatment sites.
65	3.3.1	SSW15B	Conjunctive use of Blithfield with River Severn WTW: Improved conveyance across the distribution network to enable better conjunctive use.
66	6.1.1	SSW26A	40 Ml/d capacity treatment works on the Trent, with 6 month bankside storage. 40Ml/d intake on the River Trent between Rugeley and Yoxall
67	6.1.2	SSW26B	30 Ml/d capacity treatment works on the Tame, with 6 month bankside storage. 30Mld intake on the River Tame between Tamworth and Alrewas.
68	6.1.3	SSW26C	70 Ml/d capacity treatment works on the Trent, with 6 month bankside storage. 70Ml/d intake on the River Trent between Alrewas and Burton.
69	n/a	SSW28	Raw water abstraction from the Dove, with bankside storage
70	7.1.1	SSW21A1	Third Party Option: Canal & River Trust: Stanley Pool/Caldon Canal

71	n/a	SSW21A2	Third Party Option: Canal & River Trust: Severn – Blithfield reservoir transfer
72	7.1.2	SSW21A3	Third Party Option: Canal & River Trust: Birmingham Blithfield surplus
73	7.1.3	SSW21A4	Third Party Option: Canal & River Trust: Bradley (Bilston)
74	7.1.4	SSW21A5	Third Party Option: Canal & River Trust: SH/SO options (Belvide)
75	7.1.5	SSW21A6	Third Party Option: Canal & River Trust: Chasewater options
76	7.1.6	SSW21A7	Third Party Option: Canal & River Trust: Victoria shaft
77	7.2.1	SSW29A	Third Party Option: Coal Authority Dewatering: Cannock Wood
78	7.2.2	SSW29B	Third Party Option: Coal Authority Dewatering: Ash Bank
79	7.2.3	SSW29C	Third Party Option: Coal Authority Dewatering: Saltersford and Cadely Hill
80	7.2.4	SSW29D	Third Party Option: Coal Authority Dewatering: Transfer to Wyrely
81	7.2.5	SSW29E	Third Party Option: Coal Authority Dewatering: Handsacre
82	7.2.6	SSW29F	Third Party Option: Coal Authority Dewatering: Mid Cannock
83	7.2.7	SSW29G	Third Party Option: Coal Authority Dewatering: Coal Authority boreholes
84	7.3.1	SSW47	Utilise Shropshire GW Scheme - Phase 6
85	7.3.2	SSW47	Utilise Shropshire GW Scheme - Phase 6 & 7
86	7.3.3	SSW47	Utilise Shropshire GW Scheme - Phase 6, 7 & 8
87	7.4.1	n/a	Import ST water from Perry Barr DSR into Barr Beacon DSR
88	7.5.1	n/a	Import raw water from United Utilities (Transfer via River Severn)
89	n/a	SSW32	Water trading from Severn Trent
90	n/a	SSW33	Cease to supply Severn Trent from River Severn WTW
91	n/a	SSW35	Expand Chasewater
92	n/a	SSW37	Effluent reuse
93	n/a	SSW38	HS2 Dewatering
94	n/a	SSW17	Develop unused commercial boreholes: Identify suitable propositions.
95	n/a	SSW19	Licence trading in the Mease catchment, add to CC licence.
96	n/a	SSW30	New Quarry Storage
97	n/a	SSW31	Create storage in gravel pits
98	n/a	SSW36	Flood storage reservoir

We have listed the 190 unconstrained '*Leakage reduction*, *Metering and water efficiency*' options below:

	Option number	Option type	Option Name
1	1	Leakage	Mains Replacement
2	2	Target water efficiency to other abstractors	
3	3	Direct abstraction	Targeted information concerning the benefits of trickle irrigation compared to spray irrigation.
4	4	Direct abstraction	Targeted water efficiency information to other abstractors
5	5	Leakage	Advice and information on leakage detection and fixing techniques (Agriculture)
6	7	Leakage	Advice and information on leakage detection and fixing techniques (Household Customers)
7	8	Leakage	In house awareness campaign to reduce internal losses
8	9	Leakage	Incentives and gamification for customer leakage reporting
9	11	Investigate and lobby for improved regulatory incentives for reducing leakage	Leakage
10	12	Charging only above a defined 'subsistence' level of use	
11	13	Tariffs	Check tariff already not offered
12	14	Tariffs	Check tariff already not offered
13	15	Increasing volumetric charges for metered customers	
14	16	Introducing daily peak/off peak tariffs for at least some seasons	
15	17	Changes to existing measured tariffs. (Introducing summer/winter or other seasonal tariffs)	
16	18	Introduction of rising volumetric charges - rising block tariff.	
17	19	Household water efficiency programme (company led, self install)	
18	20	Household water efficiency programme (company led, plumber installed)	

19	21	Household water efficiency programme (partnering approach, home visit)	
20	22A	Non HH water efficiency programme (company led, self install)	
21	22b	Non HH water efficiency programme (company led, self install)	
22	23A	Non HH water efficiency programme (company led, site visit with installation)	
23	23b	Non HH water efficiency programme (company led, site visit with installation)	
24	24	Water efficiency	Non-household water efficiency programme (Partnering approach, site visit)
25	26	Metering	Meter all households within a water stressed area
26	27	Metering	Meter all households where a meter or meter box already exists.
27	28	Meter all households with an outside tap, swimming pools, hot tubs, sprinklers.	
28	29	Meter all remaining industrial premises	We can do this via the retailer - we would not treating them preferentially
29	30	Metering	Meter all sprinkler/hosepipe users
30	31	Meter all remaining currently unmetered swimming pool owners	
31	32	Leakage	Combined into B-L183
32	33	Leakage	Combined into B-L183
33	34	Leakage	Combined into B-L183
34	*35*	*Meters in unmetered boundary boxes (ghost metering)*	
35	36	Special tariff for customers who use external appliances (sprinklers, hosepipe, outside tap, hot tubs, jet washers)	
36	37	Special tariff for outside taps	
37	38	Special tariff for sprinkler users	
38	39	Special tariff for swimming pool owners	

39	40	Introducing lower charges for major customers with significant storage	
40	41	Introduce improved incentives to reduce SPL	
41	42	Tariffs	This option is excluded as it is unlikely to deliver any water efficiency savings
42	43	Introducing 'interruptible' industrial supplies	
43	44	Introducing spot pricing for selected customers	
44	45	Leakage	Advanced technologies for precise and accurate leak location - acoustics
45	46	Leakage	Advanced technologies for precise and accurate leak location - in-pipe devices
46	47	Leakage	Advanced technologies for precise and accurate leak location - tracer gases
47	48	Leakage	Analysis of social media for leak notification
48	49	Leakage	Appropriate incentives for leakage staff
49	50	Leakage	Benchmark ALC performance against other companies
50	51	Leakage	Better DMAs
51	52	Better engagement to increase optant rate to identify cspl	Leakage
52	53	Leakage	Better estimates/measurement of USPL (underground supply pipe losses)
53	54	Better mapping and register of underground assets	Leakage
54	55	Leakage	Better signage on repairs
55	56	Better training development succession planning	Leakage
56	57	Better trunk mains monitoring	Leakage
57	58	Leakage	Better understand rates and mechanisms of repeat failures on the same assets
58	59	Better understanding of HH night use/ LNU dynamic calculation	Leakage
59	60	Better understanding of non HH water use and night use	Leakage
60	61	Leakage	Classification of existing DMAs for appropriate ALC action

61	62	Leakage	Develop appropriate seasonal response strategies
62	63	Develop improved leakage data collection & analysis	Leakage
63	64	Develop predictive pipe aging model	Leakage
64	65	Develop metrics and monitoring to quantify SR leakage	Leakage
65	66	Leakage	Installation of district meters
66	67	Leakage	Horizon scanning of leakage developments
67	68	Leakage	Identify the causal factors for bursts and leakage
68	69	Identify most effective model for F&F resources	Leakage
69	70	Improve DMA meters through audit, quantification of MUR, replacement, correct sizing etc.	Leakage
70	71	Leakage	Improved analytics to detect leak breakouts
71	72	Leakage	Improved data visualisation of leaks
72	73	Increase F&F budget by X%	Leakage
73	74	Instant access to flow data for inspectors	Leakage
74	75	Leakage	Knowledge sharing
75	76	Leakage	Leak reporting app with pictures and GPS functionality
76	77	Monthly reconciliation of TIF and MNF	Leakage
77	78	Permanent noise and other monitoring	Leakage
78	79	Leakage	Quantify minor TIF components
79	*80*	*Real time network modelling at DMA level*	Leakage
80	81	Leakage	Remote sensing technologies - aircraft-based
81	82	Leakage	Remote sensing technologies - ground-based
82	83	Leakage	Remote sensing technologies - satellite-based
83	84	Leakage	Set appropriate leakage targets for each DMA
84	85	Leakage	Single feed DMAs only

85	86	Smart pipes	Leakage
86	87	Leakage	Deployment of permanent noise loggers
87	88	Use of meters for sub monitoring/ step testing	Leakage
88	89	Adoption of keyhole repair techniques	Leakage
89	90	Leakage	Be more operationally efficient
90	91	Leakage	Increasing find and fix leakage control activity on communication pipes.
91	92	Leakage	Increasing find and fix leakage control activity on distribution mains.
92	93	Increasing F&F leakage control activity on trunk mains and distribution mains	Leakage
93	94	Find better leaks - evaluate leaks and prioritise their repair	Leakage
94	95	Leakage	Decreasing the time taken to fixing reported leaks
95	96	Improve quality of repairs	Leakage
96	97	Leakage	Increase no dig pipe installation
97	98	Leakage	Leakage driven asset renewal
98	99	Leakage	Make joints leak free - Quality/Make joints leak free - product development
99	100	Leakage	Measuring ALC performance
100	101	Leakage	Minimise joints
101	102	Leakage	Non-breaking pipes
102	103	Prepare deliver and manage leakage strategy	Leakage
103	104	Repair more quickly	Leakage
104	105	Leakage	Self-healing pipes
105	106	Leakage	Stop slip lining
106	107	Use technologies for repairing pipes from the inside	Leakage
107	108	Metering	all new properties already required to install meter
108	109	Metering	all new properties already required to install meter
109	110	Metering	all new properties already required to install meter
110	111	Metering on change of ownership	
111	112	Refinement of customer usage trending	

112	113	Smart metering of all households (scored on the basis of doing a trial)	
113	114	Metering	Water only company. Severn Trent Water is in charge of Sewerage. Option require further information - very unlikely to record sewage flow
114	115	Metering	Water only company. Severn Trent Water is in charge of Sewerage. Option require further information - very unlikely to record sewage flow
115	116a	Improving the enforcement of water regulations	
116	116b	Improving the enforcement of water regulations	
117	117	Water regulations	
118	118	Water efficiency	
119	119	Encouraging and advice on rainwater harvesting in new build households	
120	120	Subsidised water butts for customers	
121	121	Rain water harvesting (RWH)	Water Butts (The company subsidy)
122	122	RWH	Replacement of potable supply with sea water
123	123	RWH	Dual supply in coastal developments
124	124	Encouraging and advice on rainwater harvesting in new build non-households	
125	125	RWH	Installation of rainwater harvesting in existing households
126	126	RWH	Installation of rainwater harvesting in existing non-households
127	127	Improvements to step testing to drive efficiency	Leakage
128	*128*	*Increase pressure for leak detection*	Leakage
129	129	Optimise pressure management / robust real time pressure management	Leakage
130	130	Pressure bursting discs Pressure control valves	Leakage
131	131	Leakage	Additional Pressure Management
132	132	Explore PRV noise reduction methods	Leakage

133	133	Grey water reuse (GWR)	Treated greywater reuse in existing households.
134	134	Treated greywater reuse in new households.	
135	135	GWR	Untreated greywater reuse in commercial/public sector buildings
136	136	GWR	Untreated greywater reuse in new households
137	137	GWR	Untreated greywater reuse in existing households
138	138	GWR	Untreated greywater reuse in industrial buildings
139	139	GWR	Dual supply with greywater
140	140	GWR	Water only company
141	142	Water efficiency	Targeted water efficiency advice for designers of hot water systems, taps and water using appliances
142	143	Water efficiency	Targeted water efficiency advice for household customers
143	146	Water efficiency	Targeted water efficiency advice for public sector customers
144	145	Labelling water consumption of appliances	
145	147	Water efficiency	Targeted water efficiency advice for purchasers of water using appliances
146	148	Water efficiency	Targeted water efficiency advice for recreation facilities
147	149	Water efficiency	
148	150	Water efficient white goods	
149	151	Water efficiency	Appliance exchange programmes
150	152	Water efficiency	
151	153	Cistern displacement devices	
152	154	Water efficiency	Subsidy to appliance manufacturers
153	155	Water efficiency	Subsidy to customers that purchase water efficient appliances
154	156	Water efficiency	Composting toilets
155	157A	Dual flush toilets (social housing)	
156	157b	Dual flush toilets (private sector landlords)	
157	158	Water efficiency	Encouraging or requiring greater use of water saving technology in new or existing buildings:
158	159	Water efficiency	Fitting new toilets
159	160	Water efficiency	Fitting of showers

160	161	Water efficiency	Fitting 'people detectors'
161	162	Water efficiency	Flush controllers for urinals
162	163	Water efficiency	Limited purchase or use of instantaneous water heaters/boilers
163	164	Water efficiency	Limiting purchase/use of 'power showers'
164	165	Water efficiency	Low flow showerheads
165	166	Water efficiency	Low flush toilets
166	170	Water efficiency	Shallow trap toilets
167	171	Water efficiency	Spray taps
168	172	Water efficiency	Timing devices
169	172	Water efficiency	Timing devices
170	173	Water efficiency	Trigger nozzles for hoses
171	174	Water efficiency	Waterless urinals
172	175	Develop procedure for abandoned mains	Leakage
173	176	Improve interdepartmental information sharing	Leakage
174	177	Reduce	Leakage
175	178	Raw water and WTW leakage reduction	Leakage
176	179	Metering	Meter all Wastewater TW
177	180	Leakage driven asset renewal above baseline	Leakage
178	181	ALC targeting improvements	Leakage
179	182	Reduce leaks on new assets	Leakage
180	183	Review and strengthen current CSPL reduction programme	Leakage
181	184	Incentives and gamification for customer leakage reporting	Leakage
182	185	Improved DMAs	Leakage
183	186	Improved leakage detection and location techniques	Leakage
184	187	Improved productivity of ALC processes	Leakage
185	188	Remote sensing	Leakage
186	193	Internally plumbed Rainwater Tanks (IPRWT) on all new builds/ developments.	
187	200	Partnership with retailers for more efficient white goods	
188	203	Discounted tariff	

189	204	Treated greywater reuse in new non households.	
190	205	Quality of new developments	